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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|--------------------------|------------------|
| 10/707,822 | 01/14/2004 | Chorng-Kuang Wang | MTKP0038USA | 1821 |
| 27765 7590 02/09/2007 NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116 | | | EXAMINER FLORES, LEON | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2611 | |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | MAIL DATE | DELIVERY MODE | |
| 3 MONTHS | | 02/09/2007 | PAPER | |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| | | | |
|------------------------------|-------------------------------|-----------------------------|--|
| Office Action Summary | Application No. 10/707,822 | Applicant(s) WANG ET AL. | |
| | Examiner Leon Flores | Art Unit 2611 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/14/2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>1/14/04</u> ; <u>3/19/04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections

Claim 11 is objected to because of the following informalities: In claim 11 line 2 the limitation "compriese" should be rewritten as "comprises". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims (1-3, 7-10, & 13) are rejected under 35 U.S.C. 102(b) as being anticipated by Wynn (US Patent 6,009,317).

Re claim 1, Wynn discloses a method for reducing amplitude mismatch and phase mismatch in quadrature signals in an RF receiver (See fig. 3 & col. 2, lines 7-31), wherein the quadrature signals comprises a first signal and a second signal that are at about quadrature phase angles (See fig. 3: the output of elements 74 & 76.), the

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method comprises: modifying the second signal by a portion of the first signal so that a phase difference between the modified second signal and the first signal becomes substantially close to 90 degrees (See fig. 3: elements 74 & 76, col. 6, lines 55-60.); and modifying amplitudes of the first signal and the second signal to substantially the same values. (See col. 4, lines 35-40.)

Re claim 2, Wynn further discloses compensating a portion of the first signal to the second signal to reduce phase mismatch in the pair of quadrature signals. (See col. 7, lines 51-67, col. 8, lines 1-20.)

Re claim 3, Wynn further discloses adjusting amplitudes of the first signal and the second signal to the same value to reduce amplitude mismatch in the pair of quadrature signals. (See col. 4, lines 35-40, col. 7, lines 27-34, col. 8, lines 15-20.)

Re claim 7, Wynn discloses a low-IF receiver (See col. 5, lines 23-25) comprising: a first mixer and a second mixer for receiving RF signals and respectively generating a first signal and a second signal that are at about quadrature phase angles (See fig. 3: elements 74 & 76, see col. 6, lines 37-40 & 55-60.); an amplitude calibration module coupled to at least one of the first mixer and the second mixer, for adjusting the amplitude of at least one of the first signal and the second signal so as to make the amplitude of the first signal and the second signal substantially equal (See fig. 3: elements 52, 70, 56, 54, 86 & 88 work in conjunction to reduce amplitude mismatch.

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See col. 7, lines 24-50, col. 8, lines 17-20.); and a phase calibration module coupled to at least one of the first mixer and the second mixer, for combining a portion of the first signal with the second signal so as to make the phase difference of the first signal and the second signal substantially equal to 90 degrees. (See fig. 3: element 79, col. 6, lines 58-60)

Re claim 8, Wynn further discloses wherein the amplitude calibration module further comprises: a first amplitude calibration device coupled to the first mixer (See fig. 3: element 86); and a second amplitude calibration device coupled to the second mixer(See fig. 3: element 88).

Re claim 9, Wynn further discloses wherein the phase calibration module further comprises a phase calibration device coupled between the first mixer and the second mixer. (See fig. 3: element 79)

Re claim 10, Wynn further discloses comprising an analog front end controller (AFE controller) coupled to and controlling the amplitude calibration module and the phase calibration module so as to make the amplitude of the first signal and the second signal substantially equal and make the phase difference of the first signal and the second signal substantially equal to 90 degrees. (See fig. 3: element 62. Furthermore, processor acts as a controller in that it controls and balances the imbalances associated with the quadrature signals.)

Re claim 13, Wynn further discloses the low-if receiver of claim 7 being applied in a GSM communications system or a WLAN communications system. (See col. 1, line 62, where it discloses a RF receiver.)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims (4-6) are rejected under 35 U.S.C. 103(a) as being unpatentable over Wynn (US Patent 6,009,317) in view of Jeong (US Publication 2003/0095589 A1).

Re claim 4, Wynn discloses a method used in an RF receiver for reducing an image cross talk (See abstract. One skilled in the art would know that one way to reduce image cross talk in a receiver is by reducing the mismatch and imbalances between the quadrature signals.), the RF receiver comprising: a first mixer and a second mixer for receiving RF signals and respectively generating a first signal and a second signal that are at about quadrature phase angles (See fig. 3: elements 74 & 76, see col. 6, lines 37-40 & 55-60.); an amplitude calibration module coupled to at least one of the first mixer and the second mixer, for reducing amplitude mismatch in the pair of quadrature signals when the amplitude mismatch causes the image cross talk (See fig. 3: elements 52, 70, 56, 54, 86 & 88 work conjunction to reduce amplitude mismatch. See col. 7, lines 24-50, col. 8, lines 17-20.); and a programmable phase calibration device coupled to the pair of mixers for reducing phase mismatch in the pair of quadrature signals when the phase mismatch causes the image cross talk (See fig. 3: element 79, col. 6, lines 58-60); the method comprising: utilizing the pair of mixers to process the RF signal and to output the pair of quadrature signals (See fig. 3: elements 74 & 76, see col. 6, lines 37-40 & 55-60.); utilizing the programmable amplitude calibration device to reduce the amplitude mismatch in the pair of quadrature signals (See fig. 3: elements 52, 70, 56, 54, 86 & 88 work conjunction to reduce amplitude mismatch. See col. 7, lines 24-50, col. 8, lines 17-20.); and utilizing the programmable phase calibration device to reduce the phase mismatch in the pair of quadrature signals (See fig. 3: element 79, col. 6, lines 58-60.).

But the reference of Wynn fails to specifically disclose that wherein two ports of the programmable phase calibration device are respectively connected to two output ports of the pair of mixers. However, Jeong does. (See fig. 1: elements 114 & 104 as a whole) Jeong discloses an apparatus for estimating and correcting gain and phase imbalance in a CDMA system. Gain and phase imbalance correction takes place after the incoming signal has been converted from RF to baseband and digitized. Furthermore, one skilled in the art would know that direct conversion receiver is achieved by downconverting or mixing the RF signal with a local oscillator.

Therefore, taking the combined teachings of Wynn and Jeong as a whole, it would have been obvious to one of ordinary skill in the art to have modified the system of Wynn in the manner as claimed, and as taught by Jeong, for the benefit of detecting and correcting gain and phase imbalance.

Re claim 5, the combination of Wynn and Jeong further disclose utilizing the programmable phase calibration device to compensate a portion of the first signal to the second signal so that phase difference between the compensated second signal and the first signal becomes 90 degrees. (See fig. 3: element 79, col. 6, lines 58-60.)

Re claim 6, the combination of Wynn and Jeong further disclose utilizing the programmable amplitude calibration device to adjust amplitudes of the first signal and the second signal to the same value. (See fig. 3: elements 52, 70, 56, 54, 86 & 88 work in conjunction to reduce amplitude mismatch. See col. 7, lines 24-50, col. 8, lines 17-20.)

Claims (11 & 12) are rejected under 35 U.S.C. 103(a) as being unpatentable over Wynn (US Patent 6,009,317) and Jeong (US Publication 2003/0095589 A1), and further in view of Underwood et al. (US Patent 4,937,535)

Re claim 11, the combination of Wynn and Jeong fails to disclose that wherein the amplitude calibration module comprises a programmable gain amplifier (PGA). However, Underwood et al. does (See col. 3, lines 1-67). Underwood et al. disclose a programmable phase-gain amplifier that controls and changes the gain and phase of a signal.

Therefore, taking the combined teachings of Wynn, Jeong and Underwood et al. as a whole, it would have been obvious to one of ordinary skill in the art to have incorporated a programmable gain amplifier in the manner as claimed, for the benefit of providing gain adjustments. (See col. 4, lines 15-23)

Re claim 12, the motivation for combining these two references has already been established in claim 11 above, therefore, the references of Wynn, Jeong and Underwood et al. disclose that wherein the phase calibration module comprises a cross programmable gain amplifier (XPGA). (In Underwood et al., see col. 3, lines 1-67, col. 4, lines 1-5.)

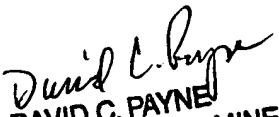
Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon Flores whose telephone number is 571-270-1201. The examiner can normally be reached on Mon-Fri 7-5pm Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LF
January 10, 2007


DAVID C. PAYNE
PRIMARY PATENT EXAMINER